

# Blended Learning and Student Literacy: What Does the Research Say?

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## Abstract

This study is a literature review using a narrative literature review approach that aims to examine the use of blended learning methods in improving students' literacy skills in schools. Articles were searched using the Sinta and Garuda databases, with 14 relevant articles found. The results of the study indicate that blended learning methods are effective in improving students' literacy skills. Blended learning methods will be more effective when combined with appropriate learning models and learning media. Additionally, this method can also have other positive impacts, such as improving students' independence in learning, creative thinking skills, self-efficacy percentages, ability to select and filter information, ability to validate and communicate credible information, and critical thinking skills.

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## 1. Introduction

Literacy skills are essential for individuals to navigate global challenges. Good literacy skills can help individuals sort through information that can support their success in life and also improve the quality of human resources (Irianto & Febrianti, 2019; Al Fajar, 2019). Literacy itself is defined as an individual's ability to engage in information-seeking activities through reading, writing, observing, analyzing, and interpreting information obtained in a critical, dialectical, idealistic, and authoritarian manner (Harahap, Addilla, & Butar, 2022). With the advancement of information and communication technology, the concept of literacy has evolved into multiliteracy, which is the ability of individuals to use various methods to understand and express ideas and information using conventional, innovative, symbolic, and multimedia texts (Abidin, Mulyati, & Yunansah, 2021). There are several types and characteristics of literacy that need to be prioritized in the development of students' multiliteracy skills, namely scientific literacy, reading and writing, numeracy, financial literacy, digital literacy, cultural literacy, and civic literacy (Wiratsiwi, 2020).

However, the literacy skills of Indonesian students are still relatively low compared to global education standards. Based on the 2022 PISA (Programme for International Student Assessment) survey, Indonesia ranked 71st in reading literacy, 67th in scientific literacy, and 70th in mathematical literacy out of 81 participating countries (Kemendikbudristek, 2023). This indicates that Indonesian students' literacy skills are still relatively low compared to global education standards (Pratama, Suharyadi, & Mustadi, 2019).

To address this issue, innovative learning approaches that are more flexible, adaptive, and relevant to the characteristics of the current digital generation are needed. One approach that can be used and is considered relevant in improving learning quality, particularly in developing literacy skills, is the use of blended learning methods (Graham, 2006). Blended learning is a pedagogical system that integrates face-to-face (offline) classroom instruction with online learning (Banggur, Situmorang, & Rusmono, 2018). The combination of these two learning processes can create a more varied, personalized, and interactive learning experience for students (Horn & Staker, 2015).

The blended learning method offers several advantages, including facilitating student access to learning materials, providing novel learning experiences, improving the quality of instruction, and reducing educational costs (Stein & Graham, 2014). Blended learning is considered effective for pedagogical implementation (Handoko & Waskoti, 2018), as this learning model can address the four challenges of 21st-century learning: technological challenges, assessment, communication methods, and learning strategies (Husamah, 2014).

Research by Ihsan and Jannah (2021) also shows that the implementation of blended learning methods in education can effectively improve the literacy skills of Indonesian students.

Based on the explanation above, the purpose of this article is to examine the use of blended learning methods in enhancing students' literacy skills in schools. It is hoped that this article will serve as a valuable resource for academics, teachers, and educational practitioners in exploring the use of blended learning as an instructional method to improve students' literacy in Indonesia.

## 2. Method

This study uses a literature review method with a narrative literature review approach that is descriptive and narrative in nature. In this research, the researcher aims to describe, summarize, and synthesize relevant literature on the topic under study without using a statistical approach. The search for articles was conducted in psychology and education journals published over the last six years, from 2018 to 2023. The search was conducted using the Sinta and Garuda databases with the keywords "blended learning," "literacy skills," "literacy skills," "reading and writing literacy," "science literacy," and "mathematics literacy."

The article sorting process was carried out using inclusion and exclusion criteria. The researcher assessed the eligibility of articles based on several criteria, including: (1) Research conducted in the last six years (2018–2023); (2) Research conducted on students from elementary school to high school; (3) Research covering science literacy, mathematics literacy, or reading and writing literacy skills.

In the initial search, 56 articles matching the above keywords were found. In the Sinta database, 34 articles were found, and in the Garuda database, 22 articles were found. The researchers then conducted a screening process by removing duplicate articles and those that did not meet the criteria by reading the abstracts of the articles. The screening process resulted in 14 relevant final articles. From these 14 articles, the researcher conducted an in-depth literature review by analyzing similarities, differences, comparing, and summarizing previous research findings into several identified themes.

## 3. Results and Discussion

### 3.1. Results

The literature review is presented in Table 1, which is organized based on previous studies that were successfully collected. The majority of the studies found are experimental research.

**Table 1. Literature Review**

No.	Researcher(s) (Year)	Subject	Design and Method	Findings
1.	Ihsan, M. S., & Jannah, S. W. (2021)	High School, Lombok	Quasi-experiment with Non-Equivalent Group Design	The learning process is considered more effective and can improve students' science literacy when interactive multimedia is used and combined with a blended learning model. With the implementation of blended learning, students' science literacy skills were categorized as good.
2.	Nurhayati, U. M. I. (2022)	Ngimbang Junior High School, Lumajang	Quasi-experiment with Non-Equivalent Group Design	The implementation of blended learning with the flipped classroom method is considered effective in enhancing students' mathematical literacy skills.
3.	Citra, et al. (2023)	High School, Kuningan	Quantitative, Quasi-experiment	Students were able to improve their science literacy skills using the Argument-Driven Inquiry model based on blended learning, as the model helped students in developing critical thinking in validating scientific knowledge supported by scientific evidence.
4.	Ramadhani & Nasution (2023)	Lanud Soewondo High School	Quantitative, Quasi-experiment	The implementation of Wordwall through blended learning can improve students' literacy skills and self-efficacy, reflected in the students' response process.
5.	Ramadhani & Ritonga (2022)	Junior High School, Medan	Quantitative, Quasi-experiment	Students who implemented the blended learning model based on Wizer.me were able to improve their mathematical thinking process, which also improved their mathematical literacy skills.
6.	Setyoko, et al. (2023)	High School, Langsa	Quasi-experiment with Non-Equivalent Group Design	Students were able to improve their learning ability through Android-based blended learning. They also improved their reading literacy, including being able to identify the truth of information and communicate it through presentations.
7.	Deta, et al. (2021)	Cerme High School, Gresik	Experiment with Non-Equivalent	The use of Edmodo-based blended learning was effective in enhancing students' science literacy skills.

No.	Researcher(s) (Year)	Subject	Design and Method	Findings
8.	Banila, et al. (2021)	Bojong Gede High School, Bogor	Control Group Design Pre-experiment with One Group Pretest-Posttest Design	There was an improvement in students' science literacy skills after the implementation of blended learning with a STEM approach. The process consisted of three stages: seeking information, acquisition of information, and synthesizing knowledge.
9.	Usemahu, et al. (2022)	High School, Ambon	Pre-experiment with One Group Pretest-Posttest Design.	Students' science literacy and cognitive abilities improved after the implementation of blended learning with a STEM approach. Positive feedback was received on student engagement.
10.	Rosdiana, & Ramdhani (2023)	Junior High School, Medan	Quasi-experiment with Pretest- Posttest Design	The YouTube-based blended learning model proved effective in improving students' mathematical literacy and autonomy. It provided access to various learning sources to help students understand mathematical concepts.
11.	Bahtiar, B., & Ibrahim, I. (2021)	High School, Mataram	Cross-sectional survey method	Students with high creative thinking skills showed all indicators of creative thinking and were able to answer questions with correct concepts. Students with moderate skills struggled with systematic answers and presenting their opinions.
12.	Fitria, R., & Indana, S. (2019)	Kedungpring High School	Research and developmental	The use of Schoology-based blended learning media was effective in facilitating the improvement of students' science literacy skills. Schoology was considered practical and students were able to engage effectively with the material.
13.	Indrawati, A. C. K. (2022)	Elementary School, Sidoarjo	Qualitative	The implementation of blended learning had significant impacts on students, improving language skills, technology ability, independence, and broadening their learning experience.
14.	Dianawati, R. N., et al. (2018)	Junior High School, Semarang	Quantitative	Students were able to improve their mathematical literacy through the PMRI learning blended with blended learning. The approach was attractive and gave students space to independently understand mathematical concepts.

### 3.2. Discussion

After analyzing the literature review, several main themes were identified for further discussion, namely: (1) Factors causing low literacy skills among students in Indonesia; (2) The effectiveness of using blended learning methods; (3) Integration of learning models; and (4) Interactive learning media.

#### 3.2.1. Factors Contributing to Low Literacy Skills Among Students

Several factors contribute to low literacy skills among students in Indonesia. The first is the structure and approach to learning that is still in use. Students are still very dependent on teachers as their sole source of information in the classroom. This prevents students from developing their exploratory and evaluative skills in searching for and sorting information.

Second, students still have difficulty interpreting visual data such as tables, graphs, and diagrams. This indicates the weakness of students' data literacy skills in Indonesia. Low data literacy skills can be caused by a learning approach that emphasizes memorization of theory without connecting it to students' real lives, resulting in weak knowledge transfer skills, which are the core of meaningful learning (Branford et al., 2000).

And finally, students lack an understanding of the nature of science (NoS). The nature of science is an individual's understanding of the basic characteristics of science, how scientists work, and how science is constructed and validated. Low understanding of NoS indicates that students' science literacy is still superficial and procedural. This is in line with Piaget and Vygotsky's constructivist theory, which states that an individual's literacy skills cannot develop optimally if they are not given the space to construct meaning through learning experiences.

#### 3.2.2. Effectiveness of Blended Learning Methods

Low literacy skills can be improved by using blended learning as a learning option in schools. Blended learning is a learning method concept that combines face-to-face learning and online learning with the aim of combining the advantages of both (Graham, 2006). In several studies, blended learning methods have been found to be effective and capable of improving science literacy skills (Ihsan & Jannah, 2021; Citra et al., 2023;

Deta et al., 2021; Banila et al., 2021; Usemahu et al., 2022; Bahtiar & Ibrahim, 2021; Fitria & Indana, 2019), mathematical literacy (Nurhayati, 2022; Ramadhani & Nasution, 2023; Ramadhani & Ritonga, 2022; Rosdiana & Ramdhani, 2023; Dianawati et al., 2018), and also students' reading literacy (Setyoko et al., 2023; Indrawati, 2022). This is because the blended learning method provides students with the opportunity to explore information they wish to obtain from various sources outside the classroom during online learning. Blended learning also enables students and teachers to optimize learning time and facilitates access to information.

In addition, the blended learning method can also provide several positive impacts, such as increasing students' learning independence (Rosdiana & Ramdhani, 2023; Indrawati, 2022; Dianawati et al., 2018) and improving students' creative thinking skills (Bahtiar & Ibrahim, 2021). According to Deperlioglu & Kose (2013), blended learning can stimulate improvements in skills, independent learning, and creative thinking. Students who feel they do not fully understand classroom instruction can review it at home with the help of technology, enabling them to enhance their ability to think more creatively and abstractly when understanding learning materials. Students with high creative thinking skills can answer questions by including the background, problem-solving, and appropriate concepts. Meanwhile, students with moderate creative thinking skills can answer questions systematically but cannot express their opinions well, even though the concepts they use are appropriate. Students with low skills cannot answer questions with the appropriate concepts (Bahtiar & Ibrahim, 2021).

However, the effectiveness of the blended learning method is highly dependent on its instructional design. As emphasized by Bonk & Graham (2005), blended learning will be optimal if designed to focus on students' cognitive, affective, and social engagement. Without these elements, the blended learning method risks becoming a digital replication of traditional face-to-face approaches alone.

### 3.2.3. Integration of Learning Models

Blended learning will be optimal when combined with exploratory and reflective learning models. In this study, there are four learning models that have been proven effective, namely Flipped Classroom, Argument Driven Inquiry (ADI), STEM, and Indonesian Realistic Mathematics Education (PMRI). These four learning methods emphasize involving students in the search for learning material information. Students are asked to find and study the material that will be discussed in the meeting before class begins. Thus, the teacher only acts as a facilitator and moderates the discussion session in class.

In the flipped classroom learning method, students are asked to understand the material shared by the teacher online and discuss it when the online class begins. Similarly, the PMRI, STEM, and ADI methods also apply the understanding of the material before class and involve students in searching for information on the material. In the ADI method, students are encouraged to develop their arguments after the data search process. They are given the opportunity to practice their ability to explain research questions and propose their ideas. After that, the teacher evaluates incorrect opinions and revises them through classroom discussions. The use of the Argument Driven Inquiry method emphasizes the construction and validation of students' understanding through information investigation activities. In the STEM approach, students are encouraged to integrate science, technology, engineering, and mathematics to solve real-world problems through the stages of seeking, acquiring, and synthesizing knowledge.

### 3.2.4. Interactive Learning Media

Learning media in blended learning are equally important and play a crucial role in supporting student engagement. A literature review found that there are several effective learning media that can be used, including Interactive Multimedia, Wordwall, Wizer.me, Edmodo, and Schoology. These learning media not only provide learning content but also allow students to actively interact with the material through quizzes, simulations, and guided exercises.

Additionally, all four learning media emphasize ease of use and interactive displays. Ease of use is important so that students and teachers can access the learning media flexibly. According to Fitria & Indana (2019), the learning media needed today are those that are practical to use and can interact effectively. Learning media also need to have an interactive display. In addition to increasing student motivation to learn, interactive learning media can help students understand abstract learning concepts. Interactive learning media also allow students with different learning abilities to access and process learning information that suits their individual learning styles.

However, the use of educational media must also be linked to clear pedagogical objectives. Educational media should not merely be used as technical tools but must be designed in accordance with instructional alignment principles to align with students' learning objectives, activities, and assessments.

In addition to the learning models, learning media in blended learning are equally important. The literature review identified several effective learning media, such as Interactive Multimedia, Wordwall, Wizer.me,

Edmodo, and Schoology. These media focus on ease of use and interactive features. The ease of use is important for both students and teachers to access the media flexibly. According to Fitria & Indana (2019), the learning media needed today should be practical in use and capable of interacting effectively. Learning media also needs to have an interactive display. Besides increasing student motivation, interactive learning media help students understand abstract learning concepts. Wordwall, in particular, helps stimulate students' thinking skills, while Wizer.me, an online worksheet application, also helps students develop different problem-solving steps for each question.

The collaboration of blended learning with learning models and media will lead to more positive impacts. The first impact is the improvement in students' ability to select and filter information. This is followed by an improvement in students' ability to validate and communicate the information they acquire with concrete and reliable evidence. Next, students' self-efficacy improves as they go through the process of finding the correct answers (Ramadhani & Ritonga, 2022). Lastly, students' critical thinking skills in the subjects they are studying will improve.

Blended learning will be effective if the human resources involved are supportive. Teachers who will use this learning method must master both face-to-face and online learning models. Teachers should also have good technological skills and understand the media and learning models that will be used in online learning. Learning objectives can only be achieved if teachers are proficient in and understand both learning methods.

#### 4. Conclusion

The literacy skills of Indonesian students are still considered low compared to global educational standards. One of the efforts that can be used to improve these literacy skills is by implementing the blended learning method in the learning process at schools. The blended learning method is deemed effective in enhancing students' literacy abilities, whether it be science literacy, math literacy, or reading literacy. The use of blended learning will be more effective when combined with appropriate teaching models and learning media that complement this method. Teaching models that have proven effective include the Argument Driven Inquiry (ADI) model, Flipped Classroom, STEM (Science, Technology, Engineering, and Mathematics), and PMRI (Pendidikan Matematika Realistik Indonesia). Learning media that have been proven effective include Interactive Multimedia, Wordwall, Wizer.me, Edmodo, and Schoology. In addition to improving students' literacy skills, the blended learning method also provides other positive impacts, such as increasing learning independence, creative thinking ability, the ability to choose and filter information, the ability to validate and communicate credible information, self-efficacy, and students' critical thinking skills.

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